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(54) Disposable absorbent undergarment of pants type

(57) A disposable absorbent undergarment of pants type (1) such as a disposable diaper is provided on front (6) and rear (7) waist regions with a plurality of elastic members (21,22,21A,22A,21B,22B) circumferentially extending parallel one to another and spaced apart one

from another along a longitudinal axis of the undergarment so that, between each pair of adjacent elastic members provided on one of the front and rear waist regions, each elastic member provided on the other of the front and rear waist regions is interposed so that they do not overlap.

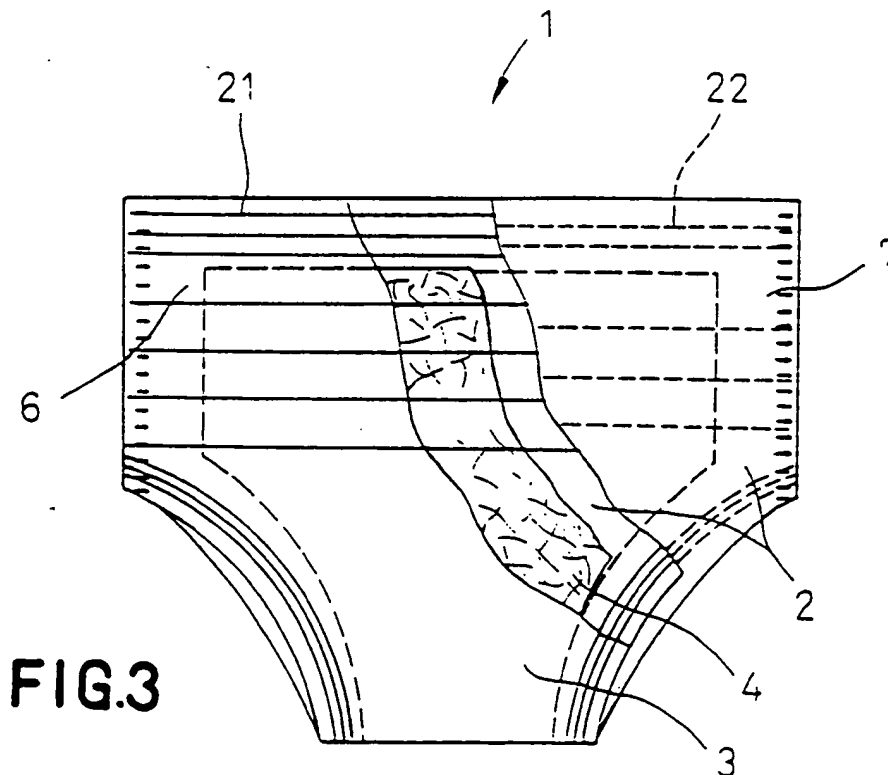


FIG.3

EP 0 787 474 A1

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## Description

The present invention relates generally to disposable absorbent undergarments of pants type suitable to be used in the form of a disposable diaper, training pants, incontinence pants or the like.

Conventional disposable diapers of pants type are generally provided along an edge of a waist-opening thereof with circumferentially extending elastic members. Specifically, Japanese Patent Publication Application No. Hei7-44945 discloses a disposable diaper provided along edges of an waist-opening defined by front and rear waist regions thereof with a first group of elastic members circumferentially extending parallel one to another and, in addition, on the front and rear waist regions between the first group and a crotch region thereof with a second group of elastic members circumferentially extending parallel one to another. In this known diaper, opposite side edges of the front and rear waist regions are put flat and joined together, respectively, to form the diaper of pants type. Consequently, the elastic members on the front and rear waist regions substantially overlap at the side edges put flat and bonded together and the respective circumferential lines of elasticity are continuous.

Locations of each side edge at which the elastic members of the front and rear waist regions overlap are substantially thicker than the remaining locations of this side edge and present the correspondingly high rigidity. As a result, the locations at which the elastic members of the front and rear waist regions overlap, form protuberances which are relatively stiff and deteriorate a touch of the diaper.

In view of the problem as has been described above, it is a principal object of the invention to provide a disposable absorbent undergarment of pants type provided on front and rear waist regions thereof with circumferentially extending elastic members wherein the elastic members are arranged so as to eliminate an apprehension that the elastic members might cause a touch of the diaper particularly at transversely opposite side edges of the diaper to be deteriorated.

The object set forth above is achieved, according to the invention, by a disposable absorbent undergarment of pants type having a longitudinal axis, a front region, a rear region and a crotch region therebetween, the undergarment comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed therebetween, the front and rear waist regions being put flat with the topsheet being located inside and bonded together along transversely opposite side edges thereof to define a waist-opening and a pair of leg-openings and provided with a plurality of elastic members circumferentially extending parallel one to another and spaced apart one from another along the longitudinal axis, wherein:

the elastic members comprise an arrangement such that, between each pair of adjacent elastic mem-

bers provided on one of the front and rear waist regions, each of the elastic members provided on the other of the front and rear waist regions is interposed.

The invention allows the disposable undergarment of pants type to offer its side edges of relatively soft and comfortable touch even when the mutually facing side edges of the front and rear waist regions are put flat and bonded together since the elastic members circumferentially extending on the front and rear waist regions alternate one with another longitudinally of the diaper without being overlapped one by another. Furthermore, the respective side edges of the front and rear waist regions present relative even and planar surfaces since along these side edges the elastic members are never overlapped one by another. This feature contributes to facilitate the side edges to be joined together, for example, by the ultrasonic-seaming.

Fig. 1 is a perspective view showing the inventive undergarment (diaper) as partially broken away;

Fig. 2 is a plan view showing the diaper as developed longitudinally thereof;

Fig. 3 is a plan view of the diaper shown by Fig. 1 as partially broken away;

Fig. 4 is a view similar to Fig. 3 showing another embodiment of the inventive diaper; and

Fig. 5 is a view similar to Fig. 3 showing still another embodiment of the inventive diaper.

Figs. 1 and 2 respectively illustrate a diaper 1 of pants type as an embodiment of the invention in a perspective view as partially broken away and in a plan view as opened along transversely opposite side edges thereof and longitudinally developed. The diaper 1 is elongate along a longitudinal axis thereof in the developed condition and has a front waist region 6, a rear waist region 7 and a crotch region 8 extending therebetween. The diaper 1 typically comprises a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4 disposed therebetween. The topsheet 2 and the backsheet 3 are joined together along portions thereof extending outward beyond a peripheral edge of the core 4 so as to define longitudinally opposite ends 10, 11, transversely opposite side edges 12, 13; 14, 15 of the front and rear waist regions 6, 7 and a pair of inwardly curved edges 16, 17 in the crotch region 8 adapted to surround the wearer's legs.

Referring to Fig. 2, the front and rear waist regions 6, 7 respectively include a plurality of elastic members 21, 22 extending along longitudinally opposite ends 10, 11 thereof and spaced apart one from another longitudinally of the diaper 1 and a plurality of elastic members 23, 23 extending along the respective inwardly curved edges 16, 17. The elastic members 21 - 23 are disposed between the topsheet 2 and the backsheet 3 or between the backsheet 3 and the core 4 so as to be secured to these two sheets 2, 3 or to the core 4. From the state shown by Fig. 2, the diaper 1 is folded in two with the

topsheet 2 being located inside, then the respective side edges 12, 14 of the front and rear waist regions 6, 7 are ultrasonic-seamed to each other at intermittent spots 20 (See Fig. 1) and similarly the respective side edges 13, 15 are ultrasonic-seamed to each other and a waist-opening and a pair of leg-openings are thereby defined as shown in Fig. 1.

Fig. 3 is a schematic plan view partially broken away of the same diaper as that shown in Fig. 1, exemplarily illustrating how the elastic members 21, 22 on the respective waist regions are arranged. According to the embodiment illustrated in Fig. 3, the elastic members 21 on the front waist region 6 are indicated by solid lines and the elastic members 22 on the rear waist region 7 are indicated by broken lines. A plurality of elastic members 21 transversely extend parallel one to another and a plurality of elastic members 22 also transversely extend parallel to one to another but alternate with the plurality of elastic members 21, respectively. The respective elastic members 21, 22 arranged in this manner are not overlapped by each other as the diaper 1 is folded in two and thereby the side edges 12, 14; 13, 15 of the diaper can be maintained in relatively planar and smooth not only before but also after being subjected to a process of the ultrasonic-seaming. The side edges 12, 14; 13, 15 which are planar prior to the ultrasonic-seaming facilitate the mutually facing side edges to be closely placed one upon another.

Fig. 4 is a view similar to Fig. 3 showing another embodiment of the invention. According to this embodiment of the diaper 1, of the elastic members 21, 22 on the respective waist regions, elastic members 21A, 22A arranged in front and rear end regions 10, 11 defined between the front and rear ends 30, 31 of the front and rear waist regions 6, 7 and longitudinally opposite ends 32, 33 of the liquid-absorbent core 4 lying in the front and rear waist regions 6, 7, respectively, extend transversely so as to alternate one with another longitudinally of the diaper 1 without being overlapped one by another. On the other hand, elastic members 21B, 22B transversely extending on the front and rear waist regions 6, 7 across the core 4 below the longitudinally opposite ends 32, 33 are overlapped one by another. It is a commonly adopted practice in making the diaper to employ a relatively wide and thick elastic member as each of the elastic members 21A, 22A in order to assure a relatively high elasticity adjacent the waist-opening and to employ a relatively narrow and thin elastic member, which has a relatively low elasticity, as each of the elastic members 21B, 22B. So far as the width as well as the thickness of each of the respective elastic members are appropriately selected, the object of the invention is satisfactorily achieved even when the elastic members 21, 22 are arranged to be partially overlapped one by another, as in the embodiment illustrated by Fig. 4.

Fig. 5 is a view similar to Fig. 3 showing still another embodiment of the invention. With the diaper 1 according to this embodiment, the elastic members 21A, 22A

extending along the longitudinally opposite ends 10, 11 of the diaper 1 are overlapped one by another but the elastic members 21B, 22B extending across the core 4 alternate one with another longitudinally of the diaper 1.

To implement the invention, nonwoven fabric, perforated plastic film or the like may be used as material for the topsheet 2 and nonwoven fabric, plastic film or the like may be used as material for the backsheet 3 of the diaper 1. The liquid-absorbent core 4 may be formed, for example, by fluff pulp or a mixture of such fluff pulp and superabsorptive particles. The respective elastic members 21, 22, 23 may be selected from those having desired cross-sectional shapes and elasticities and securing of them to the topsheet 2 and the backsheet 3 may be preferably achieved by use of hot melt type adhesive. For joining or bonding of the remaining components of the diaper 1 may be achieved by, in addition to use of appropriate adhesive agents such as hot melt type adhesive, the heat-sealing technique so far as the components to be bonded are of heat-sealable nature.

#### Claims

1. A disposable absorbent undergarment of pants type (1) having a longitudinal axis, a front region (6), a rear region (7) and a crotch region (8) therebetween, the undergarment comprising a liquid-permeable topsheet (2), a liquid-impermeable backsheet (3) and a liquid-absorbent core (4) disposed therebetween, the front (6) and rear (7) waist regions being put flat with the topsheet being located inside and joined together along transversely opposite side edges (12, 13, 14, 15) thereof to define a waist-opening and a pair of leg-openings and provided with a plurality of elastic members (21, 22) circumferentially extending parallel one to another and spaced apart one from another along the longitudinal axis, wherein:

the elastic members comprise an arrangement such that, between each pair of adjacent elastic members provided on one of the front and rear waist regions, each of the elastic members provided on the other of the front and rear waist regions is interposed.

2. The undergarment according to claim 1, wherein the arrangement of the elastic members is adopted for the elastic members (21, 22, 21A, 22A) lying within regions defined between longitudinally opposite ends (30, 31) of the front and rear regions (6, 7) and longitudinally opposite ends (32, 33) of the core (4) respectively.
3. The undergarment according to any of the preceding claims, wherein the arrangement of the elastic member is adopted for the elastic members (21B,

22B) extending across the liquid-absorbent core (4).

4. The undergarment according to any of the preceding claims, wherein each of the elastic members (21-22A) lying within regions defined between longitudinally opposite ends (30, 31) of the front and rear regions (6, 7) and longitudinally opposite ends of the core (4) respectively, has a relative width and thickness and a relatively high elasticity, and each of the elastic members (21B, 22B) extending across the liquid-absorbent core (4) has a relative narrowness and thickness and a relatively low elasticity.

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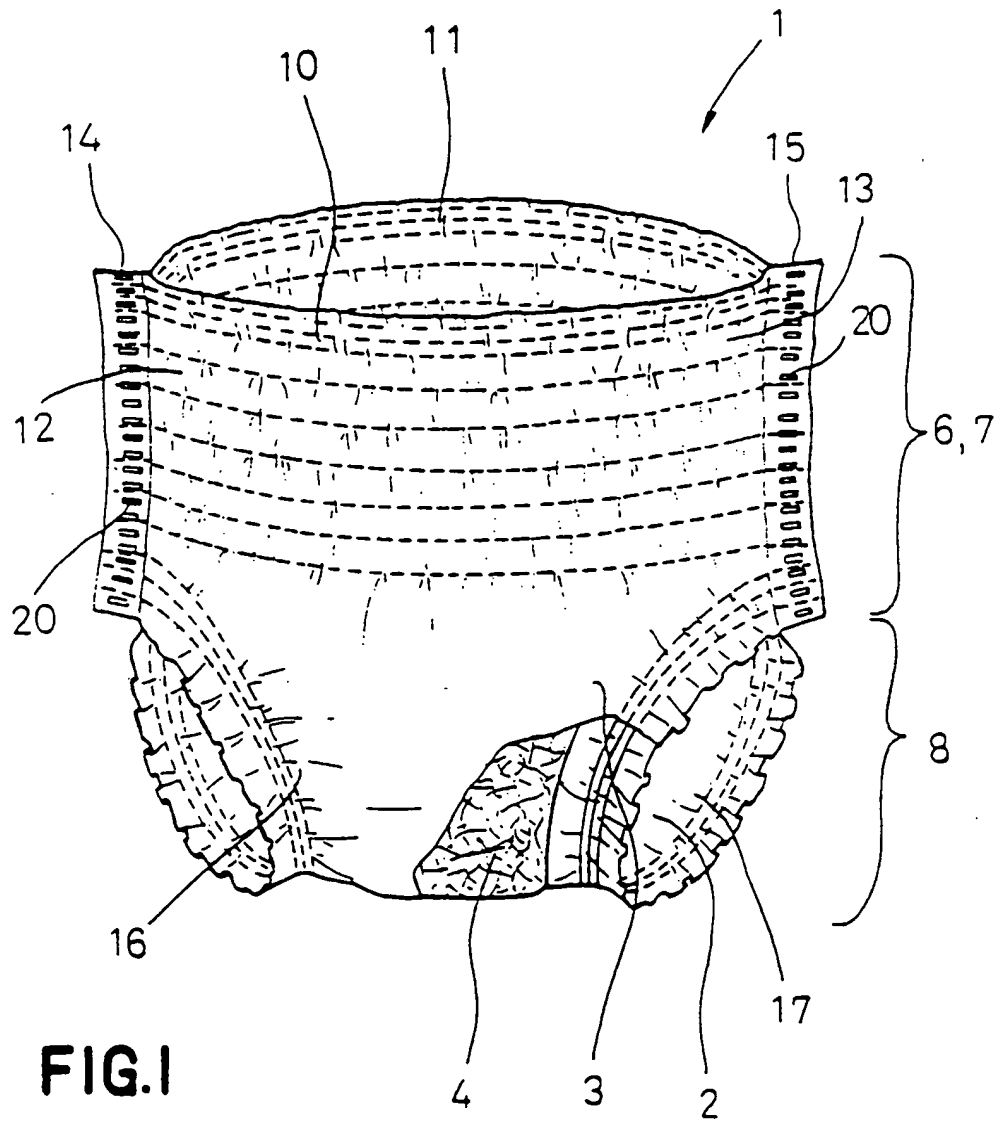
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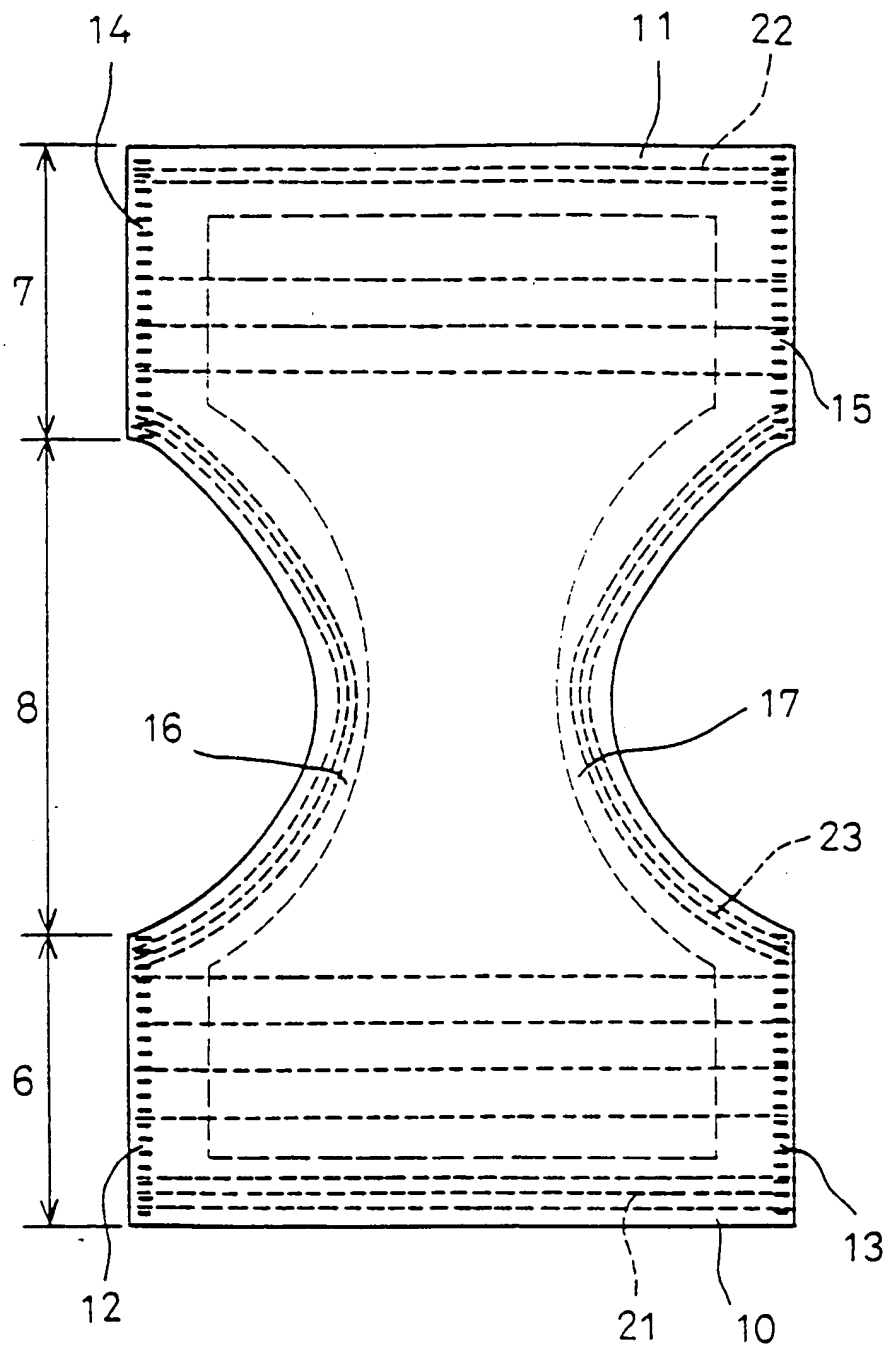
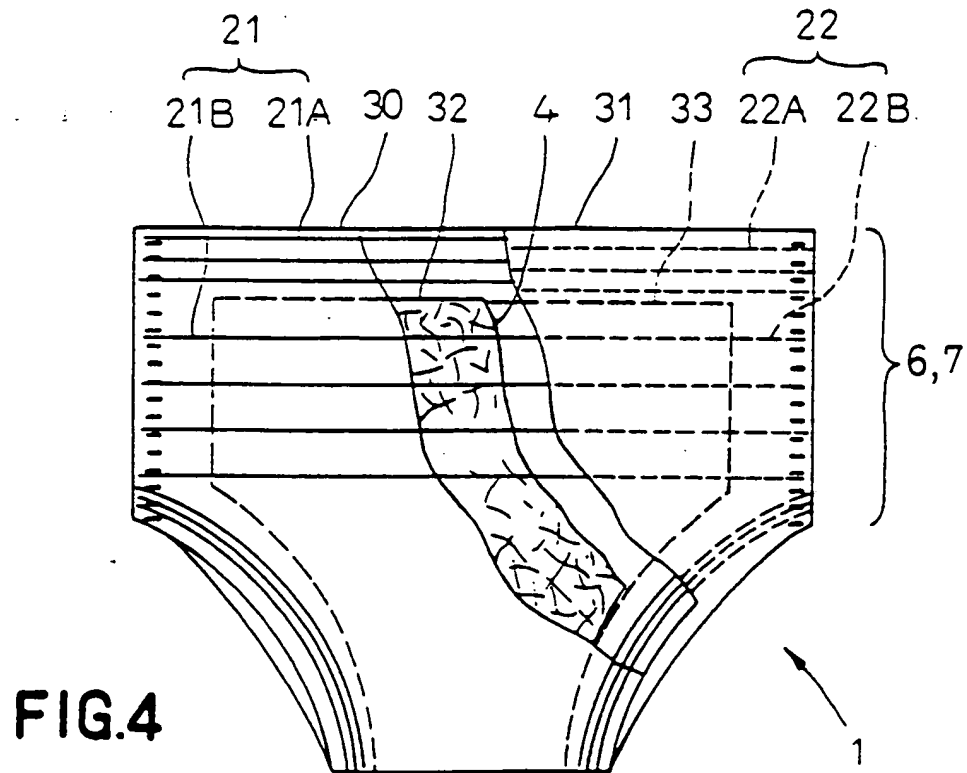
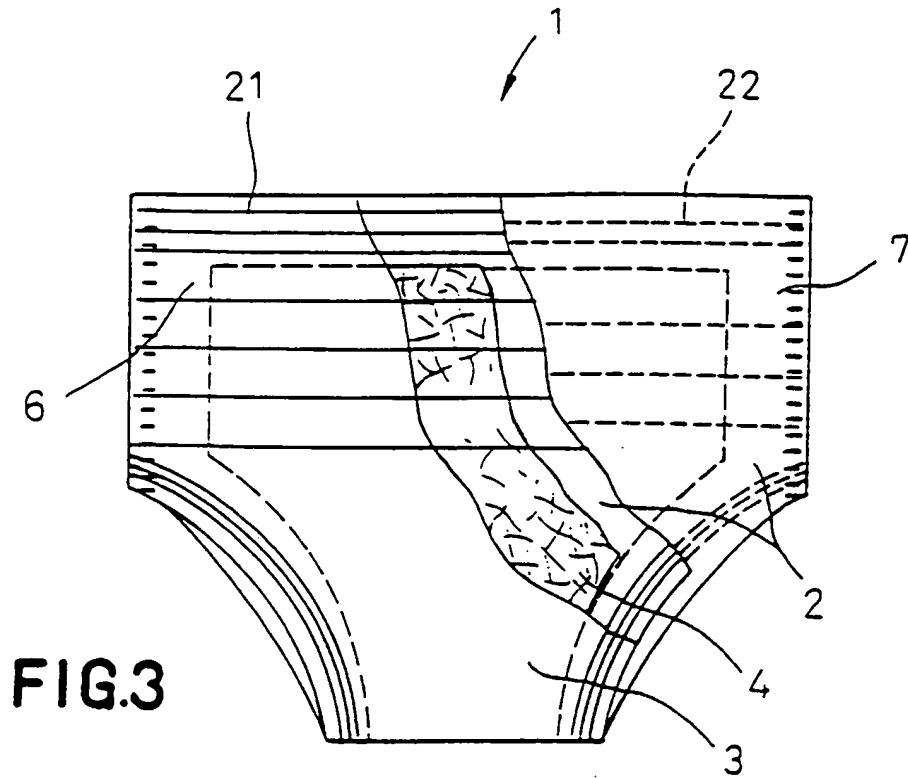
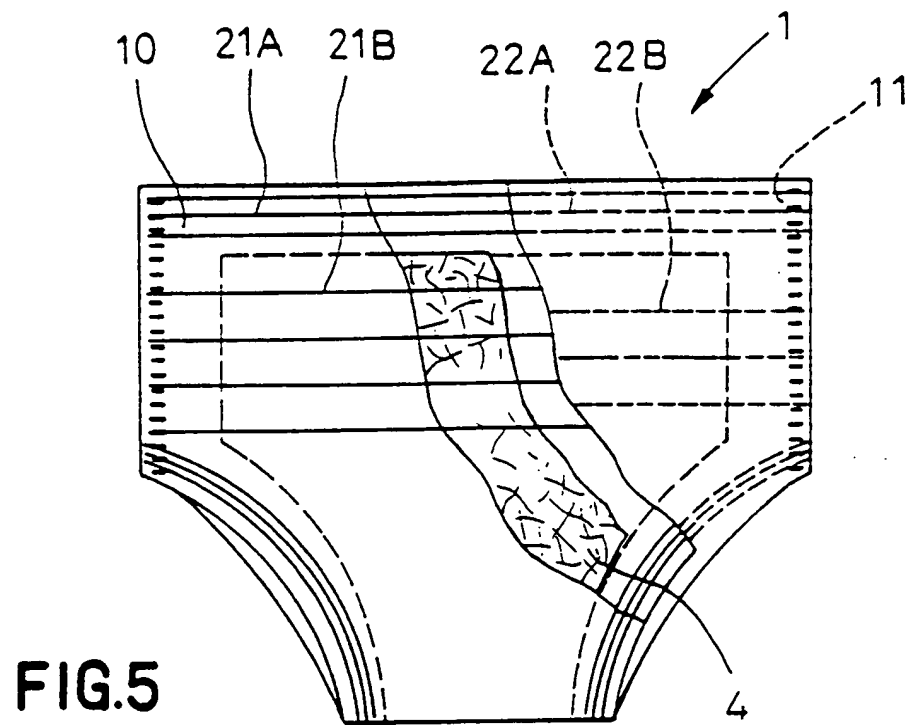


FIG.2









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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 87 0009

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.4)
A	WO 93 17648 A (MÖLNLYCKE) * page 15, line 16 - page 16, line 35; figures *	1	A61F13/15
A	EP 0 487 921 A (KAO) * abstract; figures *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A61F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		20 May 1997	Hagberg, A
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  U : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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